

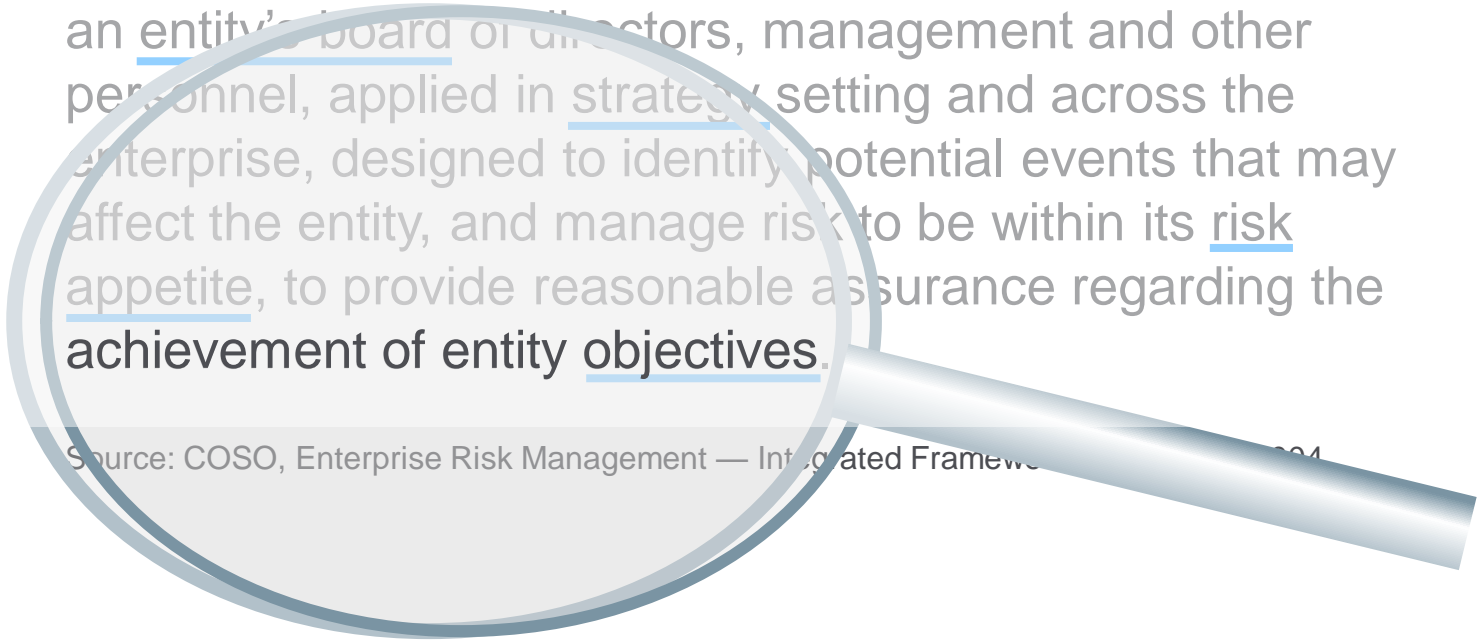


Image: Munich Re

Stresses and scenarios in the context of ORSA SAS – Afternoon Forum

23 October 2014

Lars Moormann
Integrated Risk Management



Enterprise risk management is a process, effected by an entity's board or directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the **achievement of entity objectives**.

Source: COSO, Enterprise Risk Management — Integrated Framework, 2004

ERM is a risk-based approach to proactively manage your company

Insurance Core Principles

- The supervisor requires
- the insurer to perform its **own risk and solvency assessment (ORSA)** regularly to assess the adequacy of its risk management and current, and likely **future, solvency position**.
- the insurer's **continuity analysis** to address a combination of quantitative and qualitative elements in the medium and longer-term business strategy of the insurer and include **projections of its future financial position** and analysis of its ability to meet future regulatory capital requirements.



INSURANCE CORE PRINCIPLES, STANDARDS, GUIDANCE AND ASSESSMENT METHODOLOGY

1 OCTOBER 2011

ICP 9 amended 12 October 2012
ICP 22 amended 19 October 2013

Understanding the financial vulnerability and viability of the firm

Insurance Core Principles

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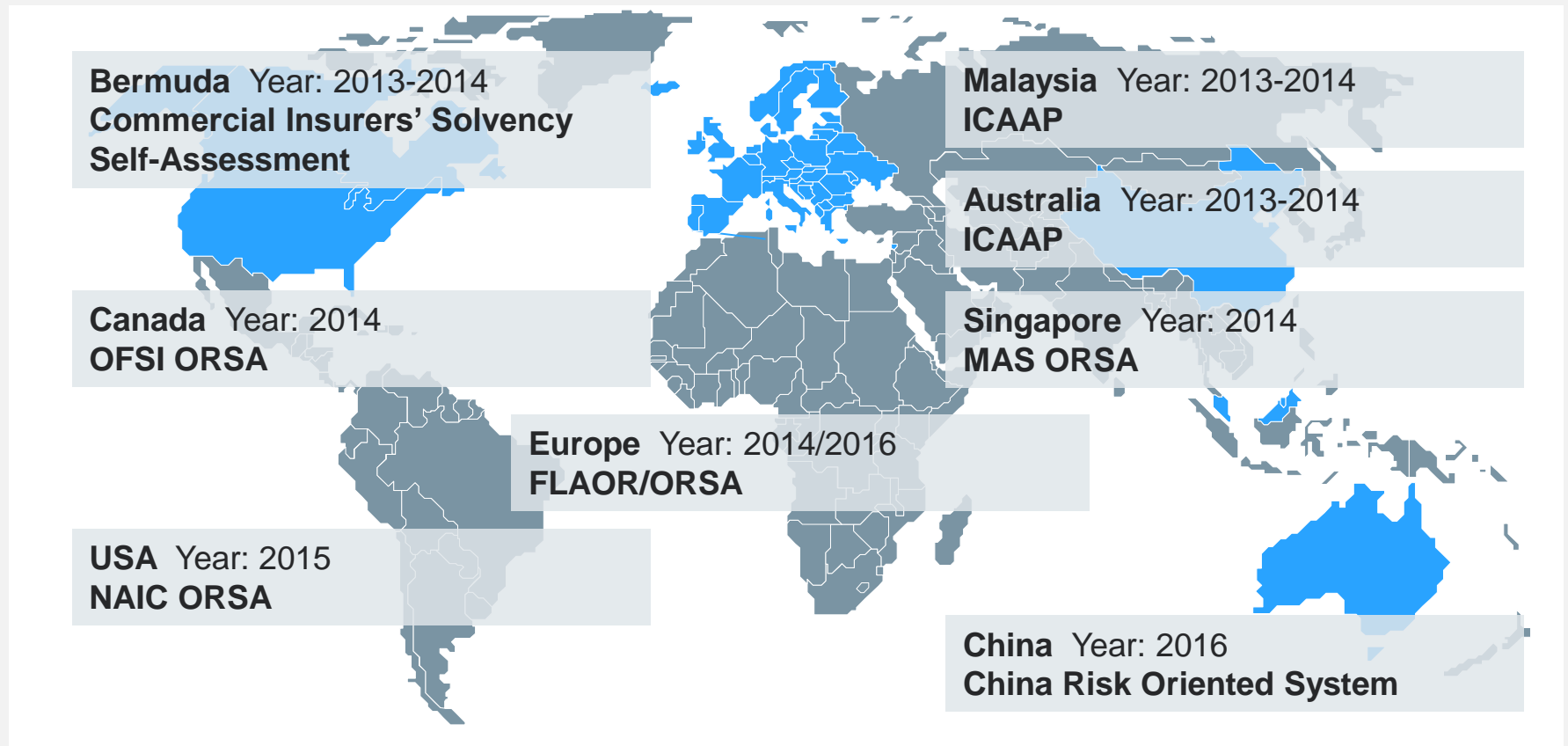
What is ORSA?

ORSA can be defined as the entirety of the processes and procedures employed to identify, assess, monitor, manage and report short and long-term risks which a company **faces or may face** and determine the own funds necessary to **cover the overall solvency needs at all times**.

Source: CEIOPS Issues Paper on ORSA, 2008

Understanding the financial vulnerability and viability of the firm

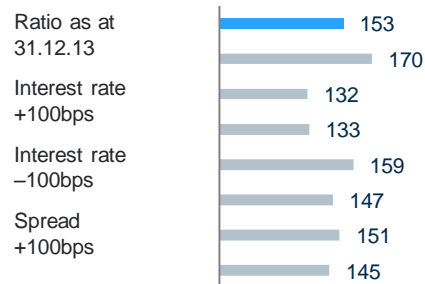
ORSA is going world-wide



Further countries will follow

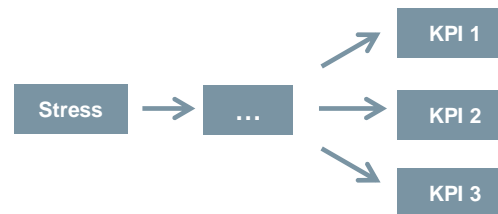
Sensitivity

A sensitivity analysis allows determination of how “sensitive” a model is to a small change of a single risk factor, and to changes in the structure of the model itself.



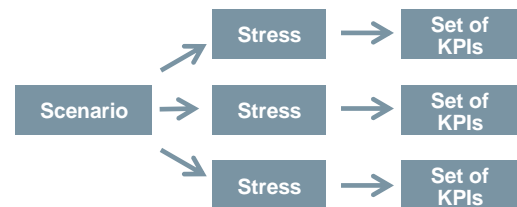
Stress

A stress is an adverse development of a single risk factor or parameter.



Scenario

A scenario is an adverse development of a number of interconnected risk factors or parameters.



**What stress tests all have in common:
they are only as good as the underlying assumptions**



Asked what he feared most, the British Prime Minister Harold Macmillan responded...

„Events, dear boy. Events“

Historical approach

Benefits:

- Trigger is identified
- Easily understandable
- Effects are known

Challenges:

Consideration of changes,
e.g.:

- Population mix
- Medical advances
- Globalization
- Inflation
- Legal and regulation



Images: used under license from Shutterstock.com

Synthetic approach

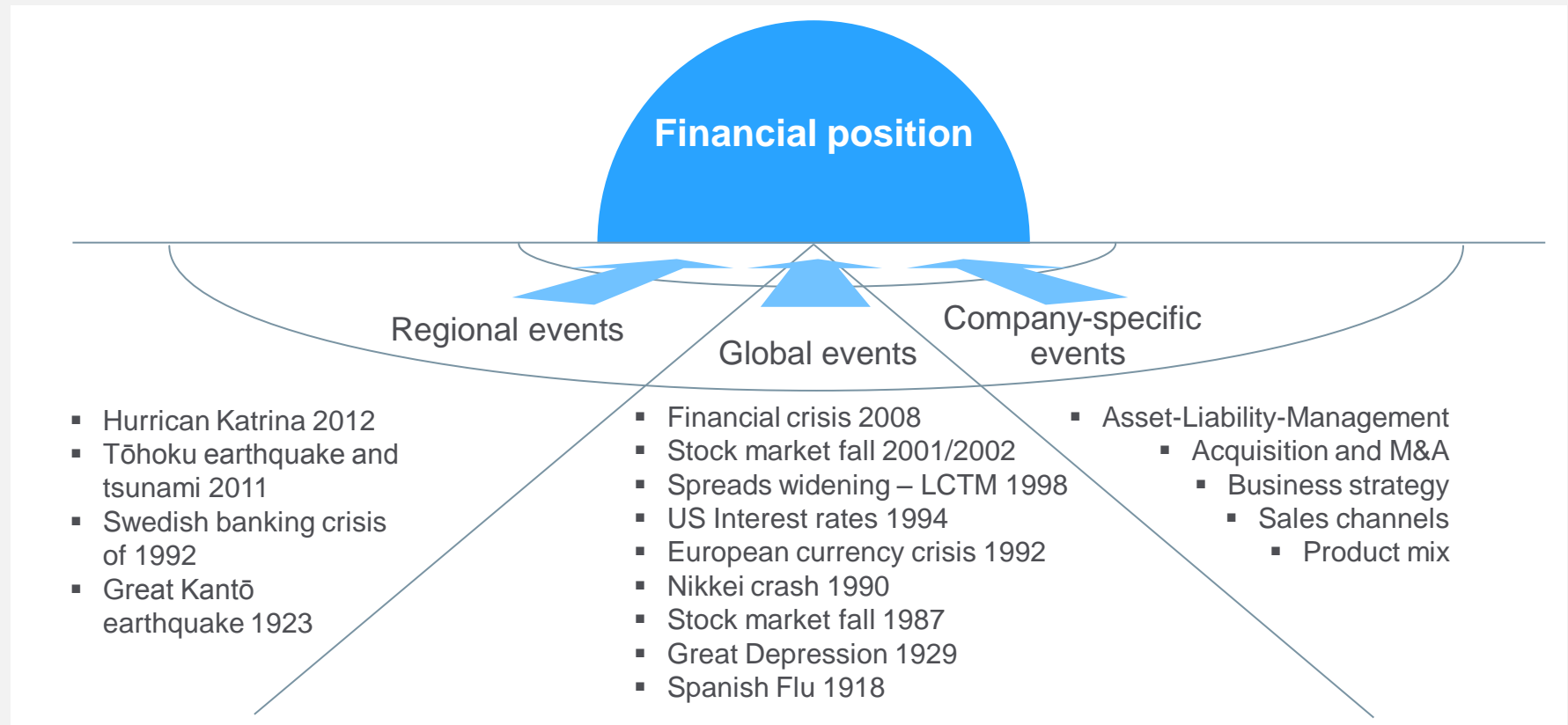
Benefits:

- Adaptation to company specifics

Challenges:

Extensive assumptions:

- Triggers
- Effects
- Correlations



Expected vs. unexpected adverse events

Risk dependencies

Relationship of risk factors

- Cause-and-effect
- Statistical

Capturing of time-dependencies or the causal relationships

Time evolution

Immediate dependencies

- Share index and price of share

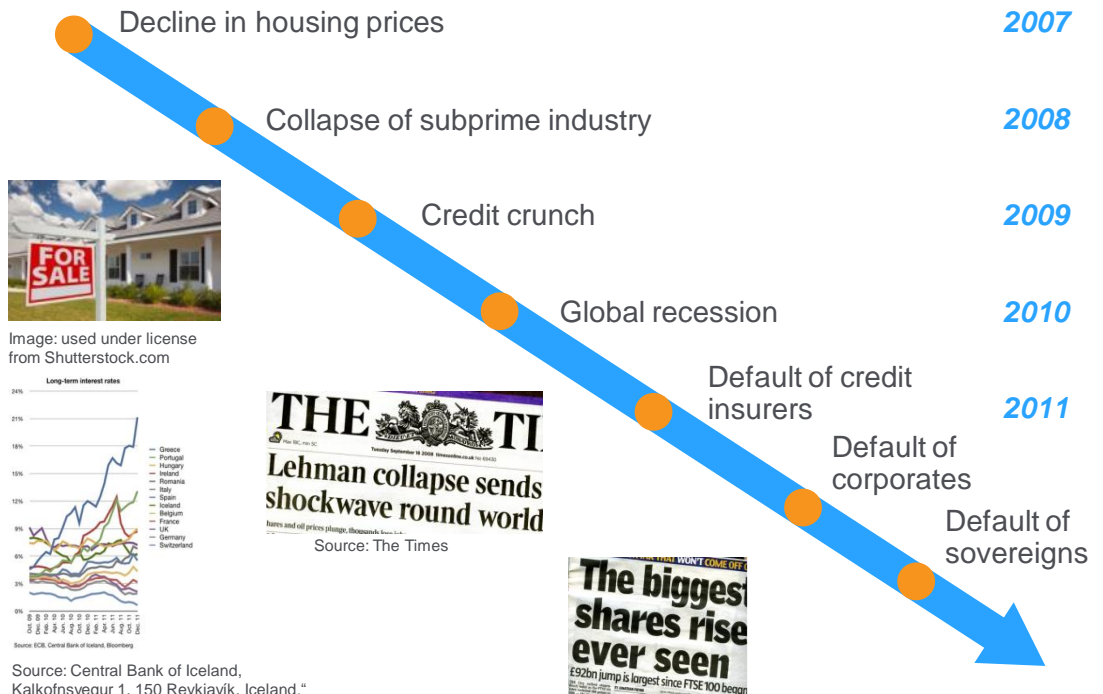
Time-lagged dependencies

- Decrease of interest rates and deflation

Phase-shift dependencies

- Increase of mortality rates and financial market

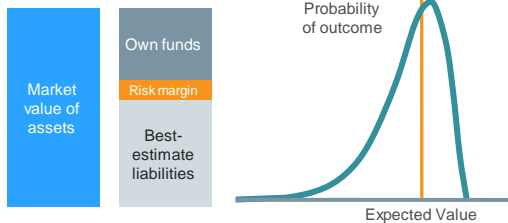
Example: Subprime Crisis



Dependencies in stressed situations are different

Impact on...

- Regulatory requirements
- IFRS / US GAAP
- Embedded Value
- Economic balance sheet
- Capital strategy and investment strategy
- Risk model and capital
- ...

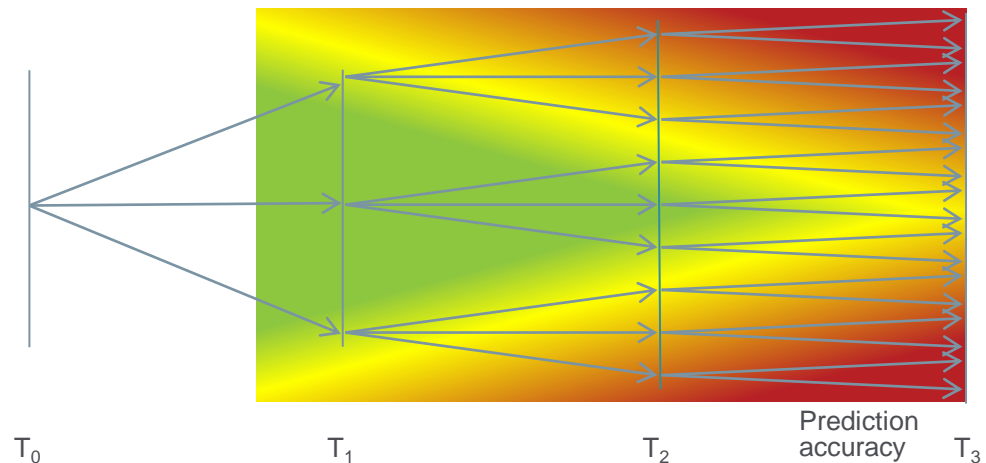


Secondary consequences

- Ratings down-grade
- Collateral requirements
- Liquidity shortfall
- Regulatory constraints
- Increased policyholder lapse
- Reputation
- Reduced business volume
- Transferability
- Higher cost of capital
- ...

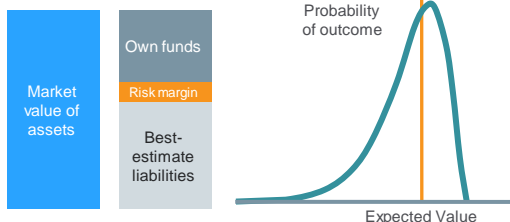
Real world scenarios

Market-consistent scenarios



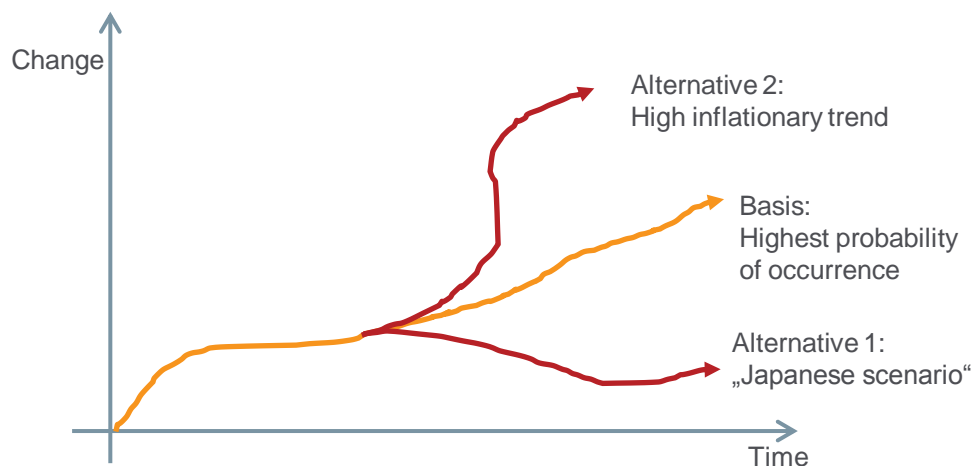
Impact on...

- Regulatory requirements
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- Economic balance sheet
- Capital strategy and investment strategy
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Secondary consequences

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- Transferability
- Higher cost of capital
- ...



Scenario story

- Narrative reports
- Context for potential events
- Visualising of impact:
 - Business strategy
 - Valuation frameworks
 - Competitiveness
- Consideration of different expectations:
 - Policyholder
 - Stakeholder
 - Regulator

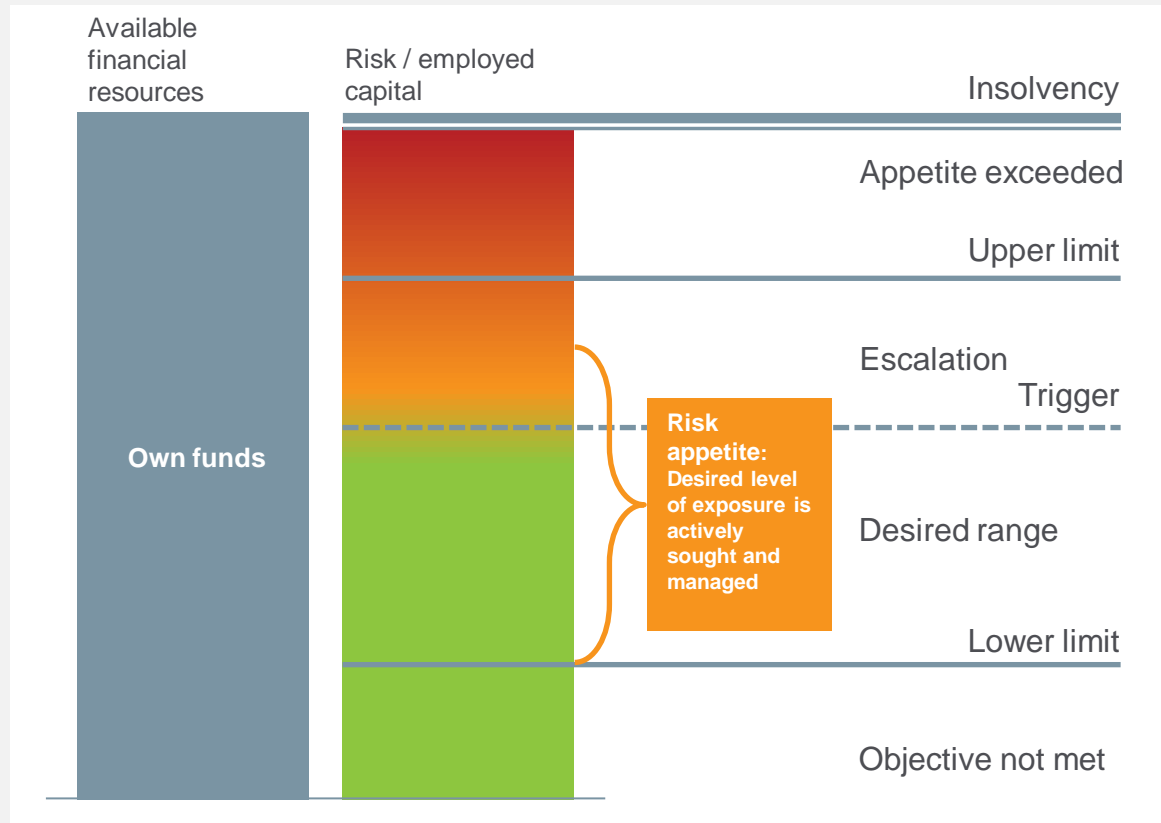


Scenario-name: Dot-com bubble

Stable income vs. minimizing risk

Scenario story

- Narrative reports
- Context for potential events
- Visualising of impact:
 - Business strategy
 - Valuation frameworks
 - Competitiveness
- Consideration of different expectations:
 - Policyholder
 - Stakeholder
 - Regulator



Stable income vs. minimizing risk



Image: Marie-Lan Nguyen

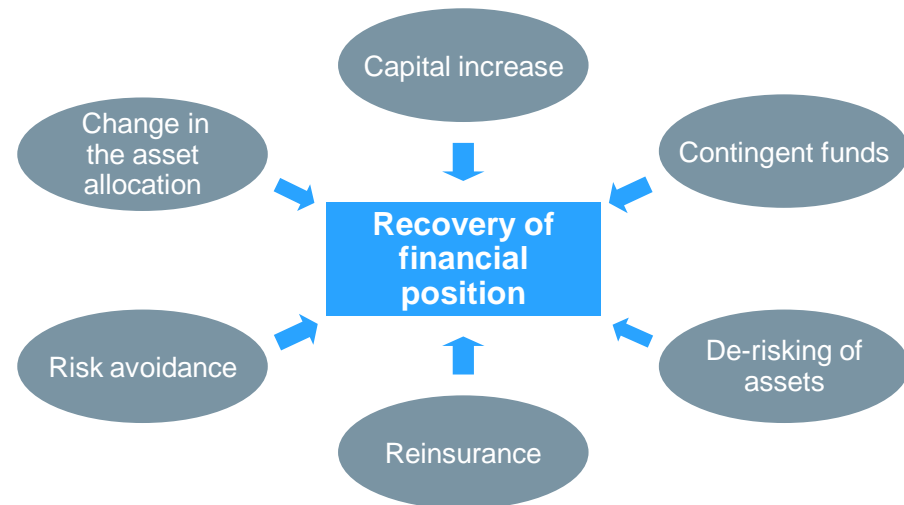
Pericles (~ 495 – 429 BC)

"It is not a matter of predicting the future, but of being prepared for it."

$$\text{Solvency Ratio} = \frac{\text{Avail. Capital}}{\text{Required Capital}}$$

Option 1:
Increasing available capital

Option 2:
Reducing required capital



**"What's our strategy if X happens?" instead
"What are the chances that X will happen?!"**

Scenario testing – Assessment of defined events

Identification and
definition of scenario

Assessment of impact
and consequences

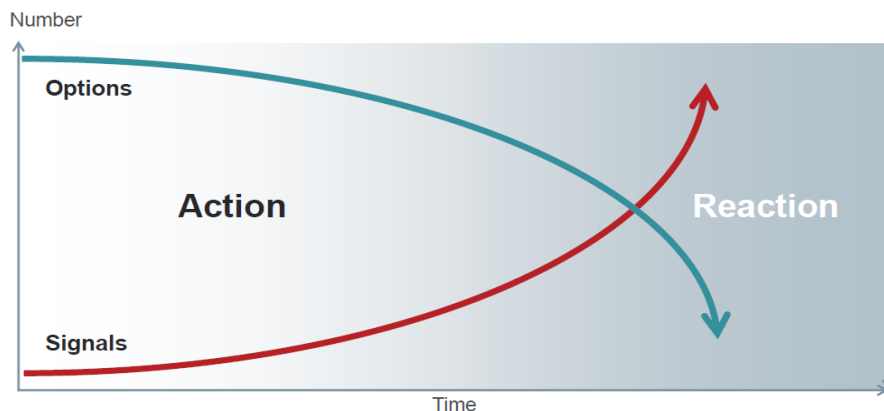
Communication and
management
decisions

Reverse stress testing – Identification of scenarios with a defined impact

Identification and
definition of scenario

Assessment of impact
and consequences

Definition of possible
financial loss



**Implementation of
countermeasures and
business contingency
plans in time**

Our business strategy*

- *Group's business model covers the relevant sections of the insurance industry's value chain*
- *Disciplined financial management ensures appropriate capitalisation at all times*
- *New insurance solutions secure competitive edge, generate profitable growth, and win clients' loyalty*
- *A forward-looking and responsible approach is an integral part of our corporate strategy*

Our risk management objectives

- *Ensuring the highest degree of confidence in meeting policyholders' and cedants' claims*
- *Protection and generation of sustainable shareholder value*
- *Protection of Munich Re's reputation*

Define risk strategy...

...closely linked to business strategy

Calculate risk-bearing capacity

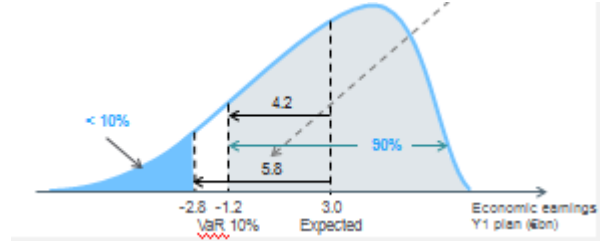
Decide on capital structure

Execute business and risk strategy

The risk strategy has to support the business strategy

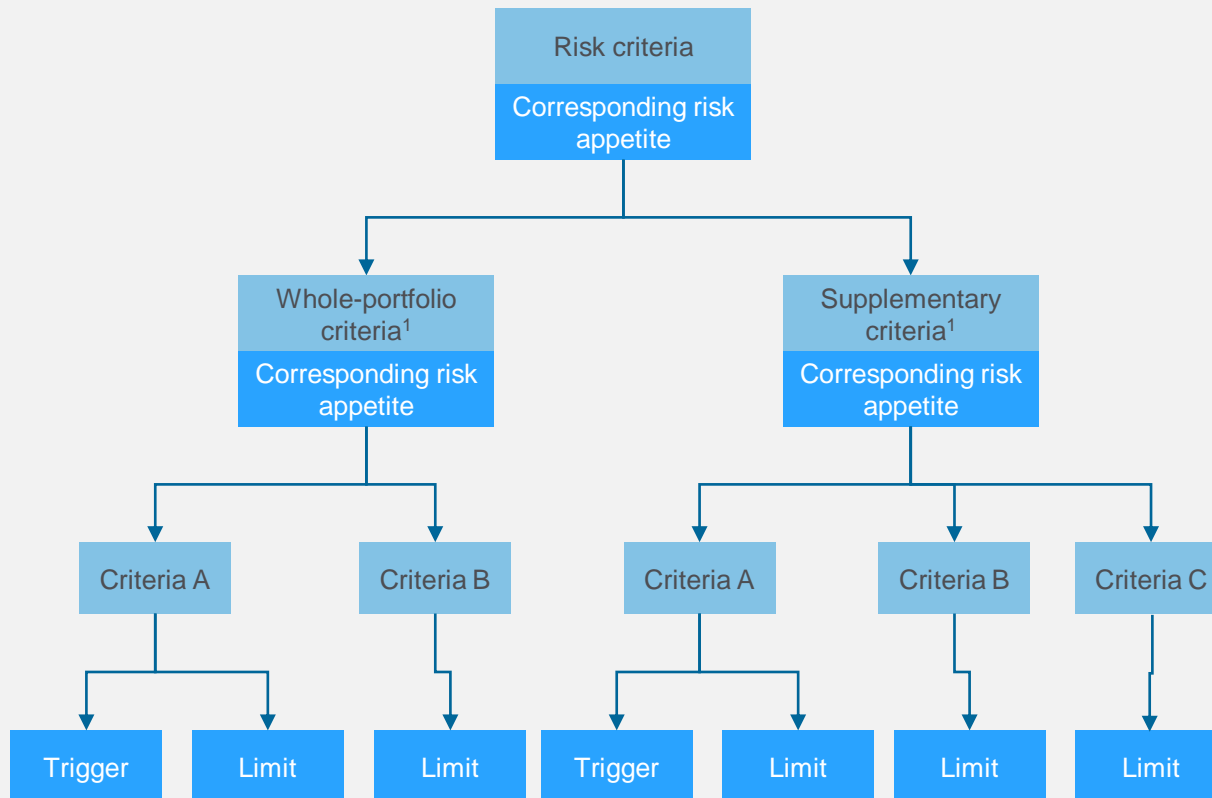
Case: Munich Re

Structure of risk strategy

Category	Risk criteria	Measure	Risk limits (Example)
Whole portfolio criteria	Financial strength	<ul style="list-style-type: none"> ERC Rating Solvency 	
	Avoiding financial distress	Probability of breaching financial strength criterion	
Supplementary criteria	<ul style="list-style-type: none"> Peak risk management ALM limits Liquidity 	VaR limits <ul style="list-style-type: none"> as % of AFR or maximum exposure figure 	<ul style="list-style-type: none"> NatCat (by scenario) Terror (by scenario) Pandemic (scenario) Longevity AL mismatch (market and credit risk by segment) Investment limits for bank exposure (group-wide) Liquidity risk (group-wide and by legal entity)
Other criteria	<ul style="list-style-type: none"> Counterparty credit risk Single risks Alternative investments Non-investment-grade investments ... 	Individual risk limits in absolute terms	<ul style="list-style-type: none"> Counterparty risk limits (group-wide) Individual risk accumulations, single risk limits (e.g. life, property, health, variable annuity) Alternative investments Non-investment-grade investments Non-standard market and credit risk structures

Case: Munich Re

Focus on risk monitoring



Framework

- Risk criteria could be split into whole-portfolio criteria and supplementary criteria
- Implementing limits and triggers to operationalise risk criteria and encode a company's risk appetite
- Various dimensions taken into account when deriving limit and trigger values – risk management, business units/risk-taker, etc.

A limit or a trigger (or both) are defined for every risk category

Case: Munich Re

Breach of limit results in management decision

Breach of limit

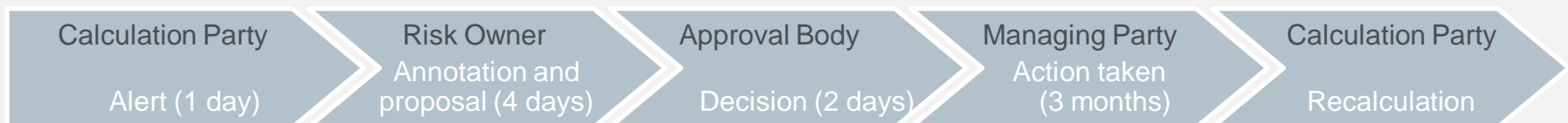
- The risk strategy is supplemented by a number of additional key performance measures and risk controls
- In the event of a limit violation, a risk-mitigation plan must be executed according to the rules and timelines
- A rule-based risk limit and trigger system alone may be insufficient, and “sound business judgment” should be used in case of execution of a mitigation plan

Challenges

Management decisions should:

- be consistent with business objectives
- be in line with obligations towards policyholders
- incorporate an assessment of the impact of changes
- encompass a comprehensive future management actions plan

Limit violation process (illustrative)



Case: Munich Re

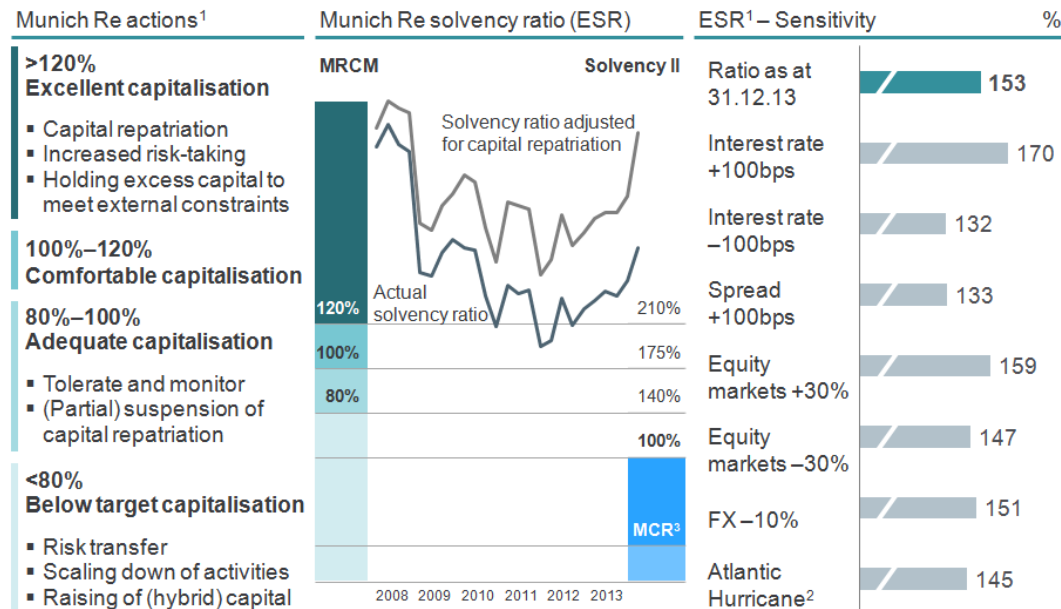
Risk strategy in practice ...

Analysts' conference 2014

Risk management – Munich Re's proven risk strategy at work

Strong capitalization allowing for attractive capital repatriation

Munich RE 



¹ Based on Munich Re capital model (MRCM): 175% of VaR 99.5%.

² Based on 200-year event.

³ MCR = minimum capital requirement, typically between 25% and 45%; for groups, called "Group SCR floor".

Analysts' conference 2014 61

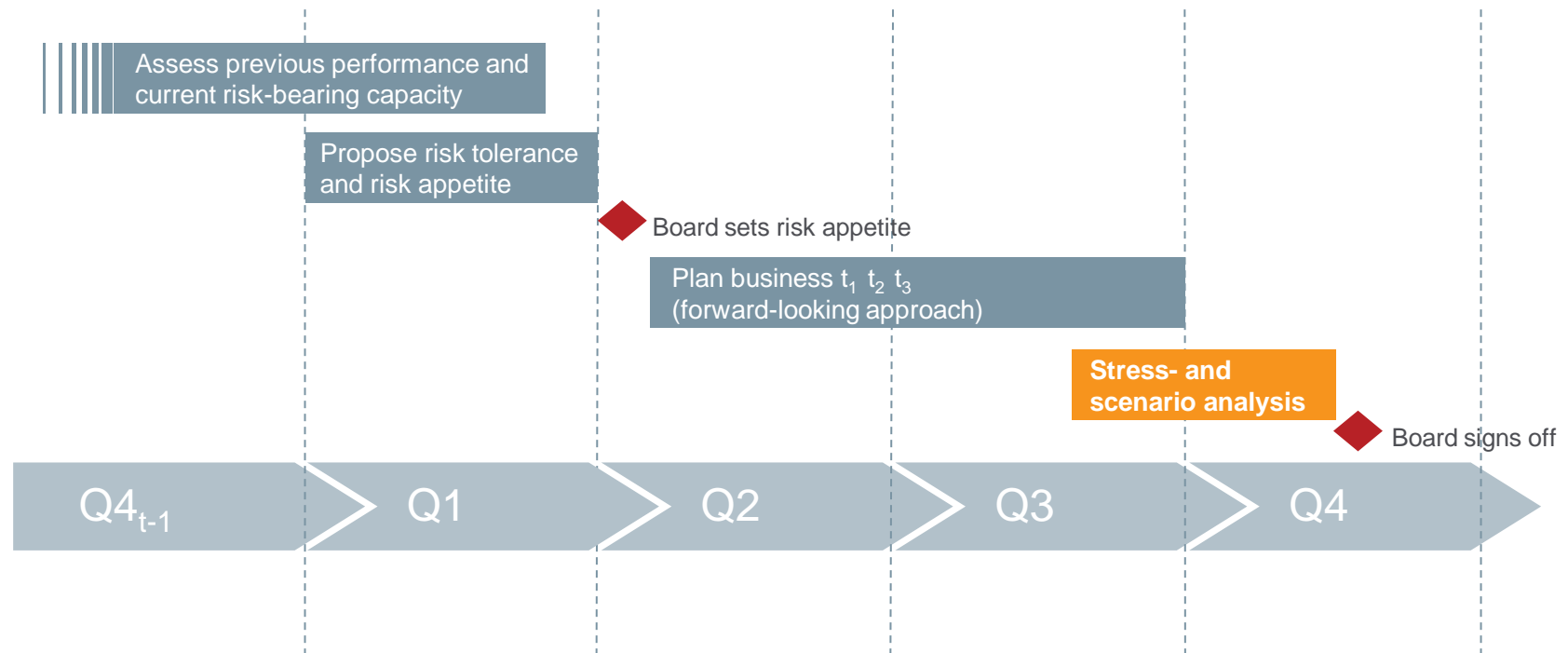
- Comprehensive communication to external stakeholders, in particular to analysts/investors
- Transparency regarding business philosophy and applicable metrics
- Economic view positioned as the lead view – important side constraints (e.g. distributable earnings of Munich Reinsurance Company) to be considered

Overall risk strategy already known in the public domain

Case: Munich Re

Embedment into existing processes

Risk strategy thoroughly incorporated into business planning process

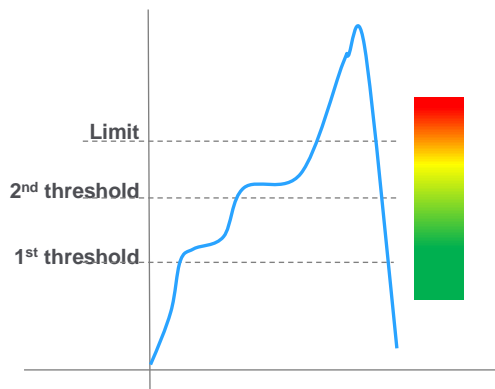


Stress- and scenario analysis should be used as a management decision tool, not just introduced to comply with regulatory requirements.

Case: Munich Re

Embedding risk appetite

Monitoring



- Regular monitoring and reporting process for risk limits

Performance



- Performance and remuneration is measured on a risk-adjusted basis
- Risk is reflected in the key performance metrics

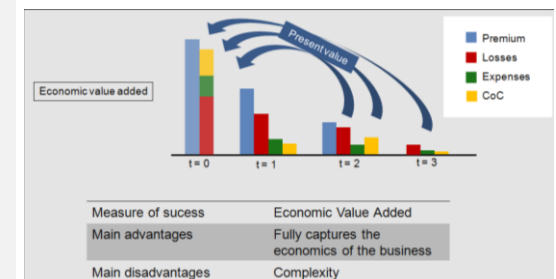
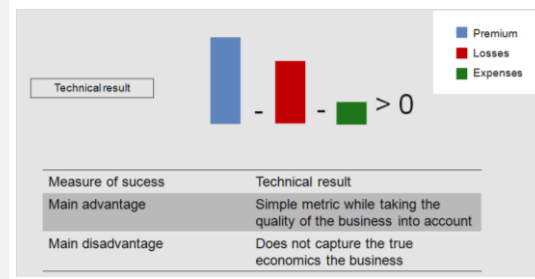
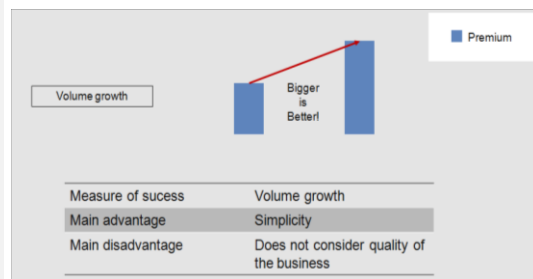
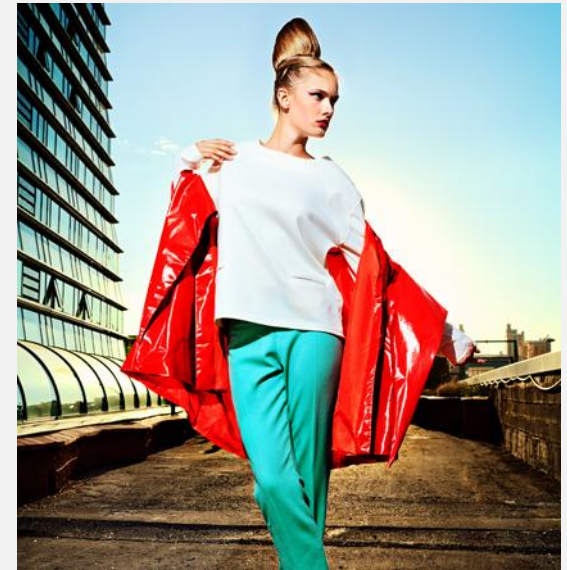
Strategy



- Strategic decisions are influenced by risk appetite
- Documentation of risk-based considerations

Turn risk into value

Style evolution

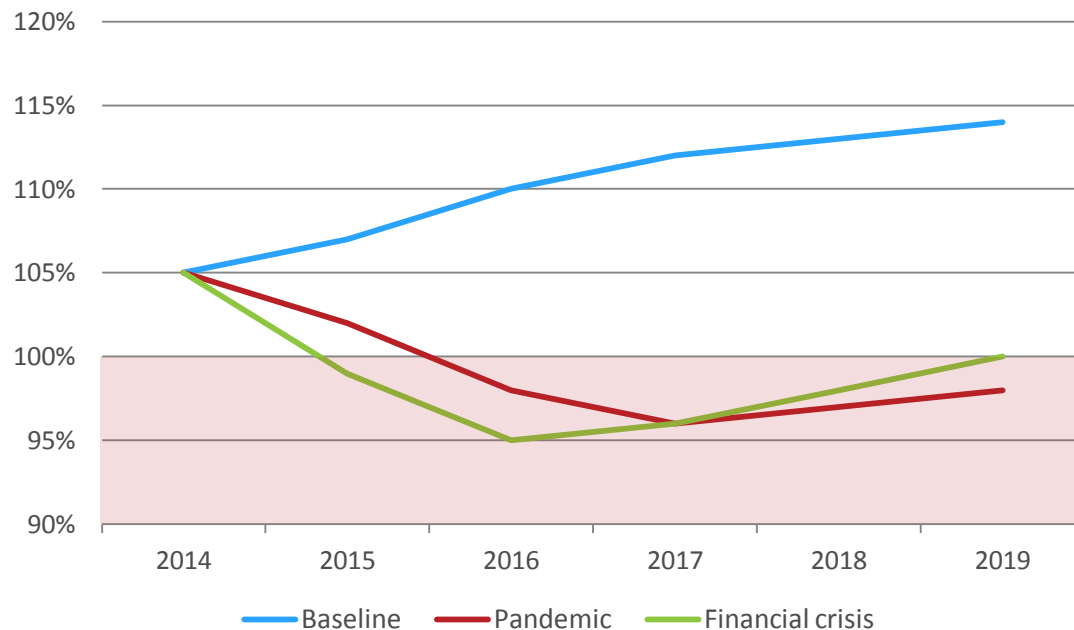


Steering evolution

Case Study



Life insurance company – Scenario analysis



Baseline:

Stable new business as in the last years

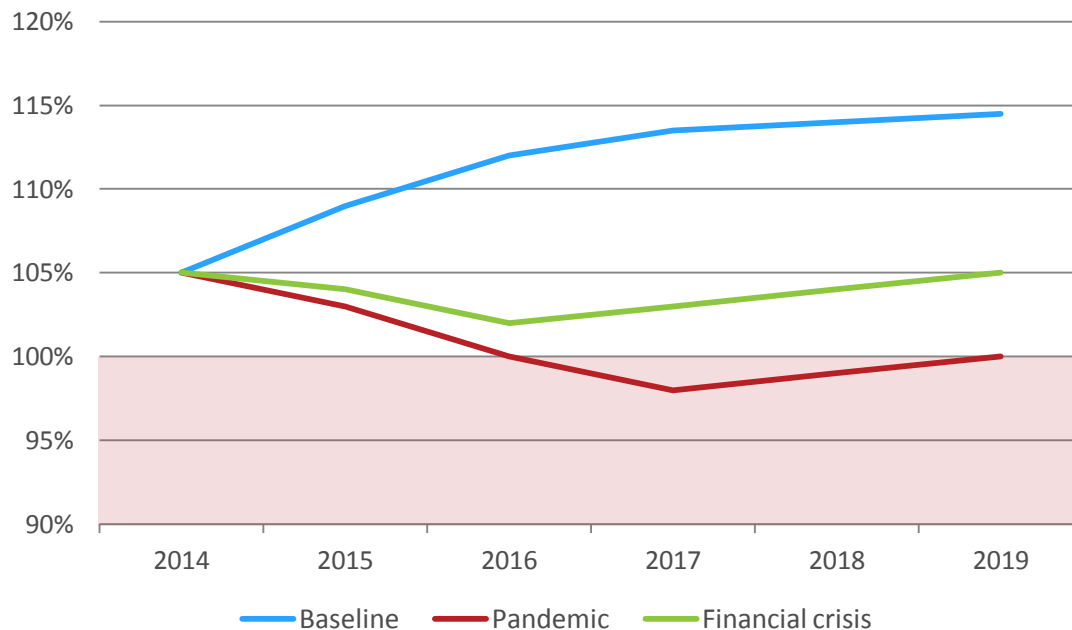
Financial crisis:

Adverse capital market development caused in falling equity prices

Pandemic:

Initial outbreak of a flu pandemic with a high level of additional mortality

Scenario analysis – Issuance of Subordinated Bond



Baseline:

Increased Solvency Ratio for the next years

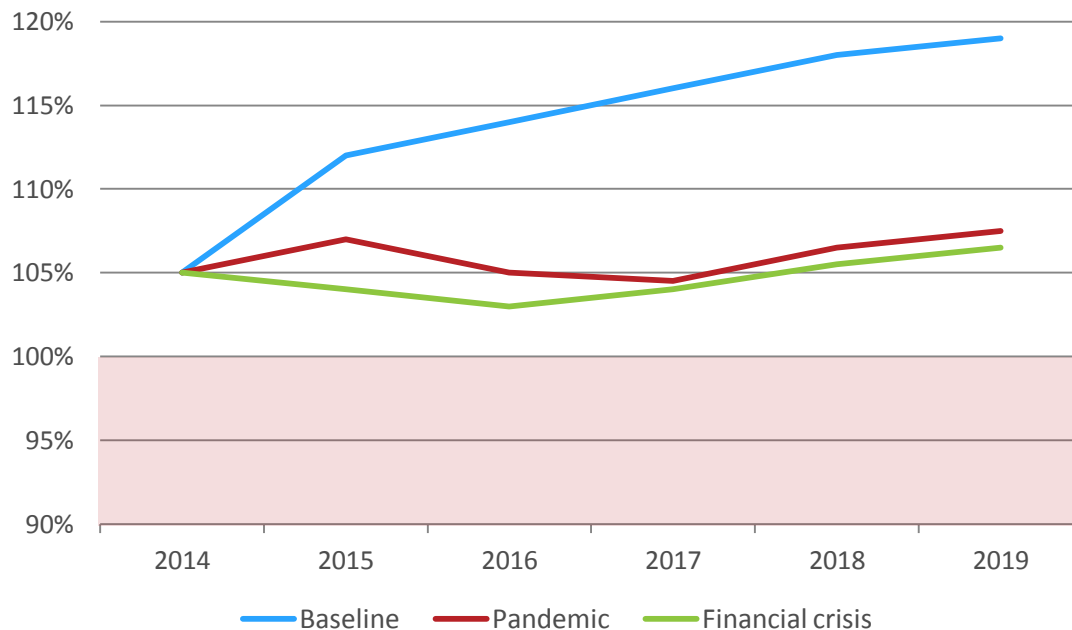
Financial crisis:

Increased Solvency Ratio, but higher spread over swap rates in stressed times

Pandemic:

Slightly increased Solvency Ratio but still below 100%

Scenario analysis – Proportional reinsurance treaty



Baseline:

Increased Solvency Ratio for the next years

Financial crisis:

Stable Solvency Ratio for the next years by using reinsurance as hedging instrument and by reducing UW-risk

Pandemic:

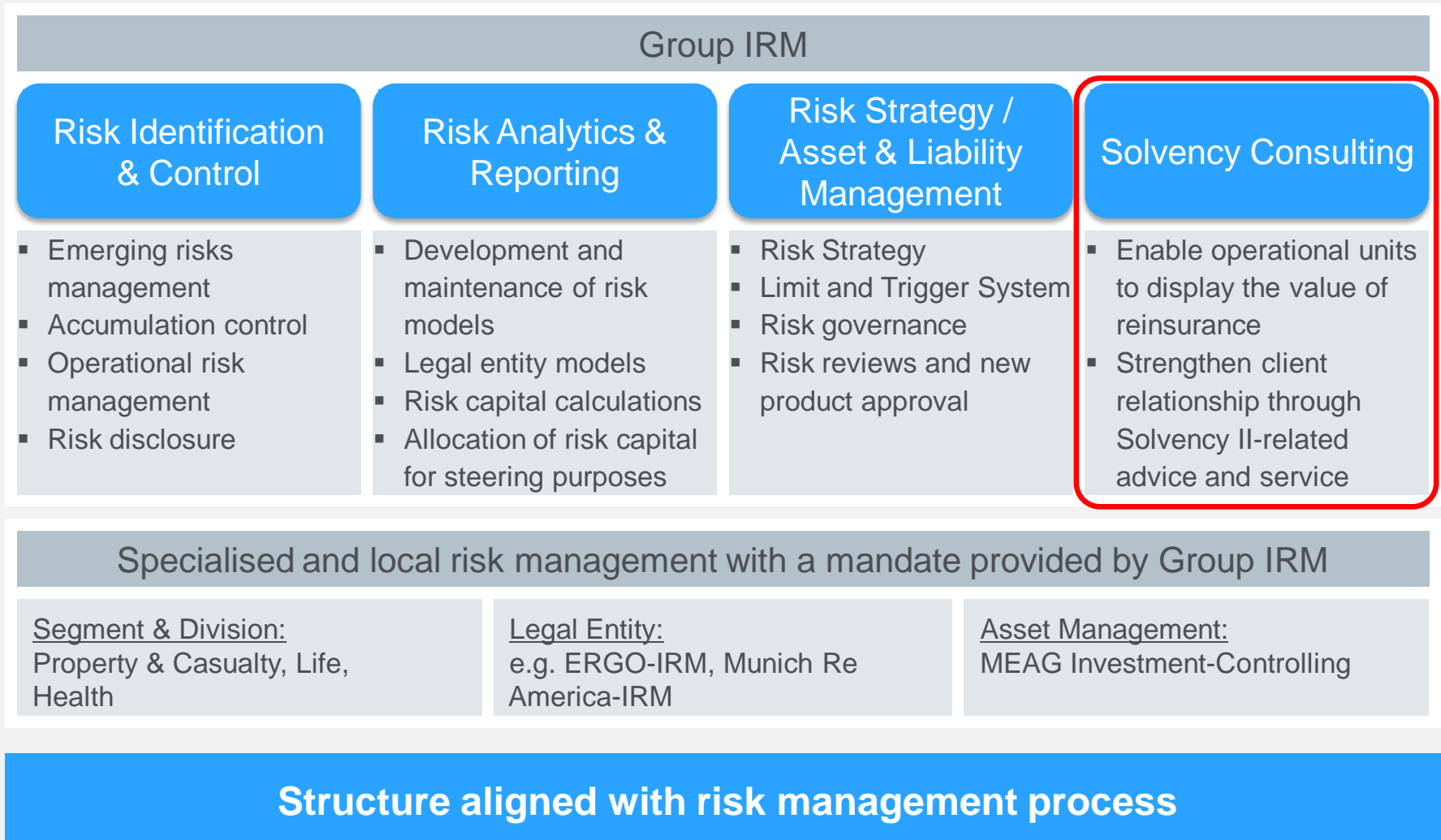
Increased Solvency Ratio by sharing the losses with reinsurer and reducing UW-risk

Support by Munich Re

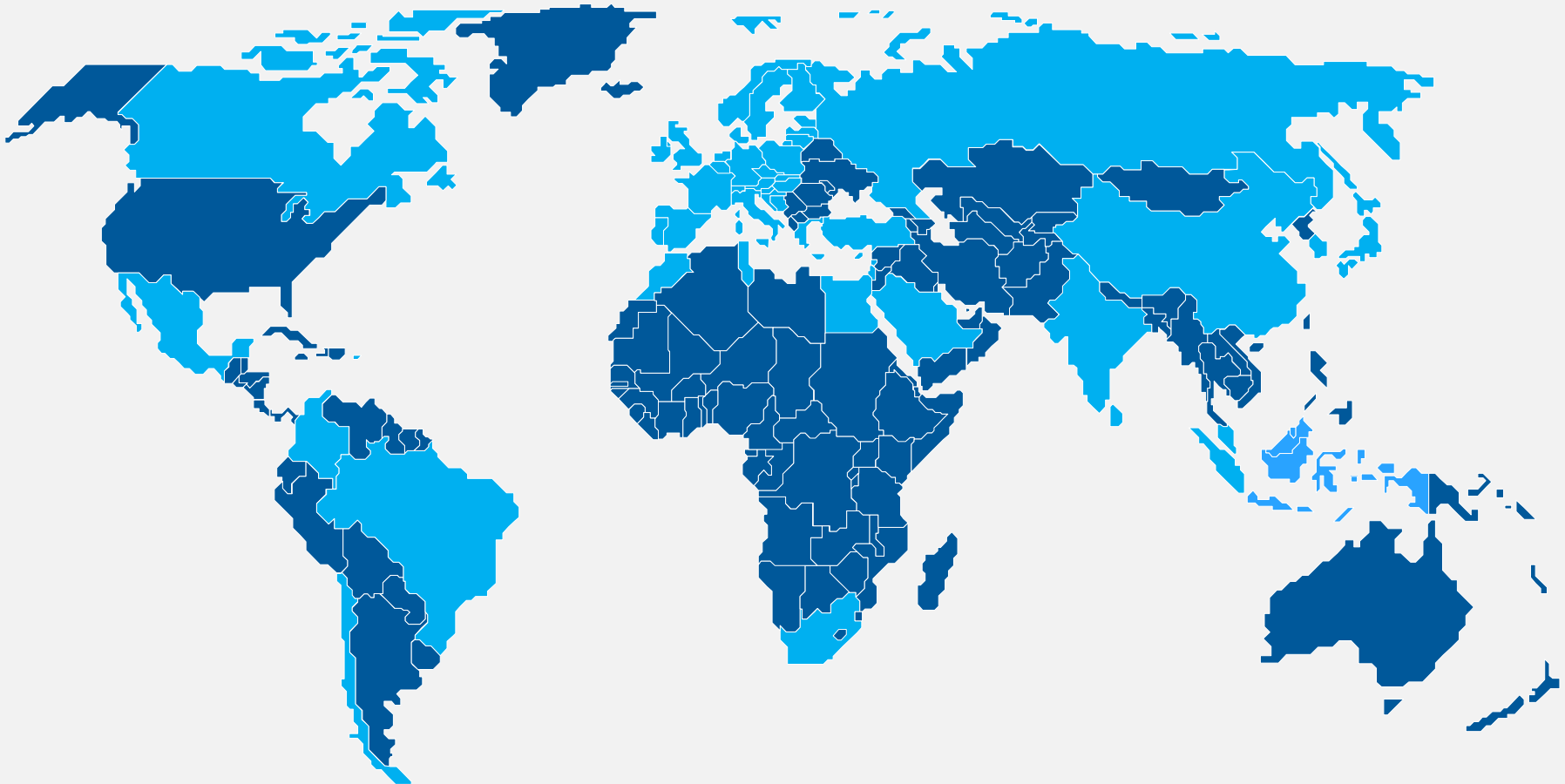



Integrated risk management at Munich Re

Structure aligned with risk management process



SoCo activities with clients worldwide



 Countries where SoCo has already conducted events

Solvency consulting product universe (extract)

Quantitative focus

Analysis of risk-based regulatory calculations, multi-year projection of balance sheet and stress scenarios (RISA)

Stochastic analysis of non-life risk (PODRA)

Stochastic analysis of biometric risk (BRiSMA)

MyStress ERM workshop for stresses & scenarios



Customised concepts

Knowledge series

Qualitative focus

ROSE workshop

MARS workshop

RASA Workshop

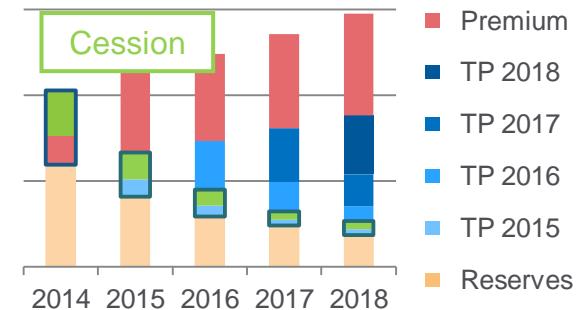
Key functions workshop / Risk Radar workshop

Governance gap analysis
ORSA organiser

RISA your future – RISA+

Assets Liabilities

Solvency Capital Requirement and Basic Solvency Capital Requirement under the standard formula			
Solvency Capital Requirement		Solvency Capital Requirement	
Basic Solvency Capital Requirement		Solvency Capital Requirement	
Diversified risk		Diversified risk	
Market risk	45,122	Market risk	45,122
Counterparty default risk	21,000	Counterparty default risk	21,000
Life Underwriting risk	3,987	Life Underwriting risk	3,987
Health Underwriting risk	0	Health Underwriting risk	0
Non-Life Underwriting risk	9,854	Non-Life Underwriting risk	9,854
net Basic Solvency Capital Requirement	82,418	net Basic Solvency Capital Requirement	82,418
Diversified risk		Diversified risk	
Market risk	45,122	Market risk	45,122
Counterparty default risk	21,000	Counterparty default risk	21,000
Life Underwriting risk	3,987	Life Underwriting risk	3,987
Health Underwriting risk	0	Health Underwriting risk	0
Non-Life Underwriting risk	9,854	Non-Life Underwriting risk	9,854
net Basic Solvency Capital Requirement	82,418	net Basic Solvency Capital Requirement	82,418

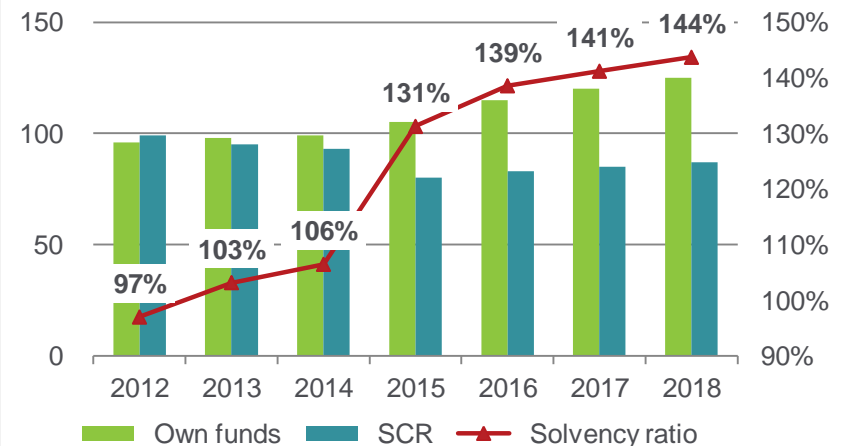


Analyse evolution of risk drivers

Solvency Capital Requirement 2015



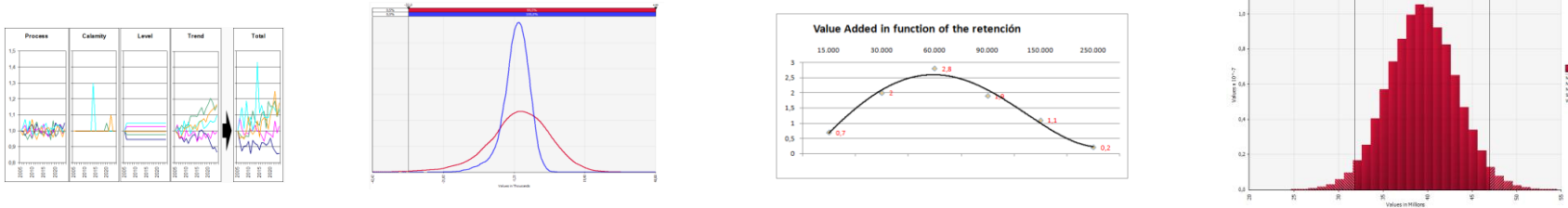
Project solvency situation



BRiSMA – A partial internal model approach for modelling life underwriting risk

Biometric risk stochastic modelling approach

A three-step project in cooperation with the client to calculate the capital requirements for life underwriting risk with a partial model based on stochastic simulations.



Analysis of reinsurance

- Analysis of current reinsurance programme from a risk-based perspective
- Identification of effect of different reinsurance parameters
- Application of possible alternative reinsurance structures and retentions and demonstration of their impact on capital requirements
- Service to enable the client to make the best possible use of reinsurance

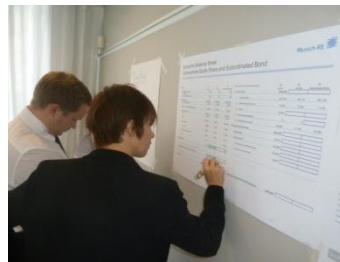
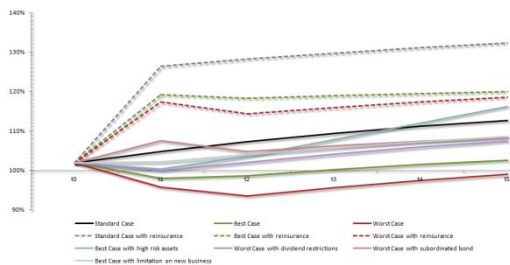
Value added

- Alternative approach to calculate the life underwriting capital requirement
- Comparison of capital requirements using deterministic or stochastic calculation approaches
- Summary of main factors driving solvency capital requirements
- Company-specific calibration
- Analysis of the cost of capital and individual effects on the embedded value

MARS Workshop – Impact of management decisions on stresses and scenarios in a multi-year projection

MARS – Multi-year Assessment of Risk Scenarios

Interactive one-day workshop focussing on the ORSA. In group work sessions the participants learn to come to a management decision based on scenarios and stresses in a multi-year projection.



Value added

This interactive workshop enables the participants

- to understand the requirements of ORSA in detail, to learn the current implementation status, and comprehend the application of ORSA around the world;
- to assess the key elements of ORSA
- to understand the impact of different risk mitigation tools on financial key figures in the economic balance sheet, capital requirements and the solvency ratio in a multi-year projection;
- to evaluate selected sensitivities and risk management tools from a quantitative and qualitative perspective in a case study using different KPIs.

Customised events – Individual events for our individual clients

» Reinsurance | 03.06.2013 | 00:00 | 

Toronto-Munich cooperation: A winning CRO client event

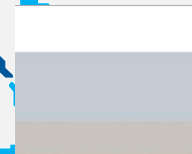
In response to Canada's changing regulatory requirements, the country's insurers have appointed many new chief risk officers (CROs), often recruiting them from the European reinsurance field. Munich Reinsurance Company of



Enterprise risk management workshop

14 to 17 October 2013

Munich RE 



Enterprise Risk Management Approaching ORSA

Singapore, 17 October 2014

Munich RE 

Description

- Workshop concepts based on the demands of our clients
- Presentations and discussions of local regulatory requirements
- Enterprise risk management topics such as investment management, capital allocation, risk strategy, emerging risks
- Combination of presentations, interactive parts and different training modules
- Adapted to level of participants



Risk management and reinsurance Regulatory developments

Johannesburg, 27 May 2013

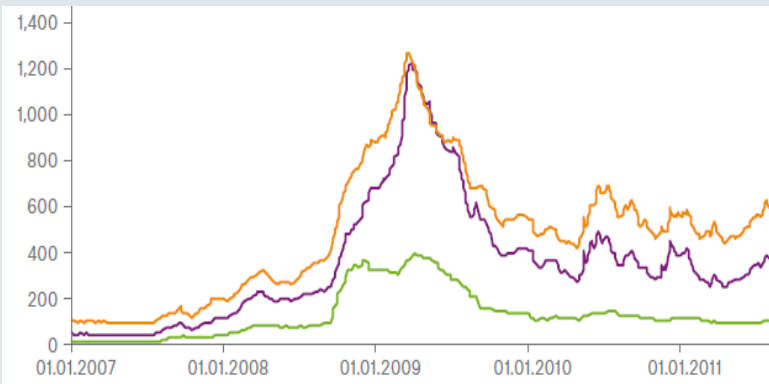
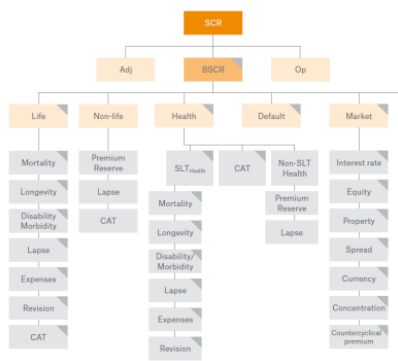
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Solvency Consulting Knowledge Series – Understanding reinsurance in the ERM context

Knowledge Series – a publication freely available at www.munichre.com

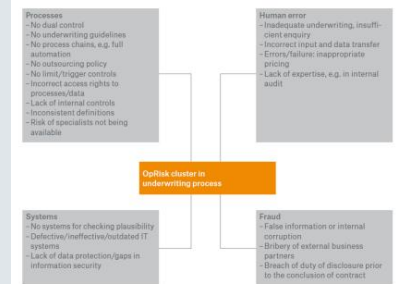
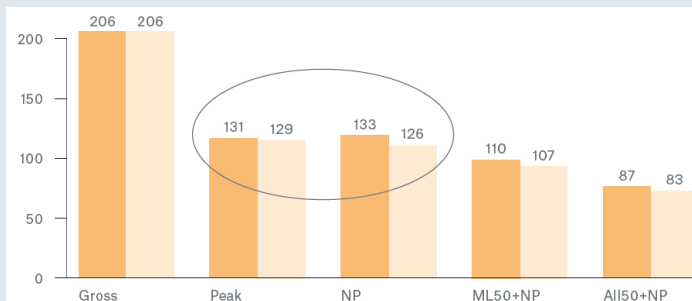
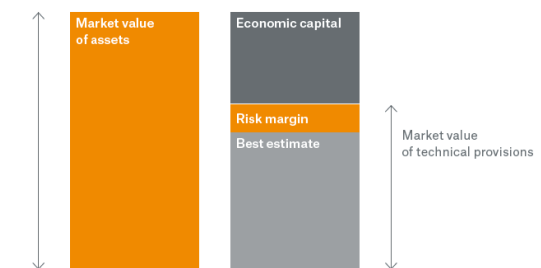
Publications cover various aspects: Regulatory development, analytical studies, experiences with tools

Fig. 2: Expected structure of the Solvency II standard approach



COMPANY CLASS

- Class 1** Single-owner captives insuring only the risks of their owners or of affiliates of their owners
- Class 2** Single or multi-owner captives deriving up to 20% of their net premiums from unconnected entities ("unrelated parties")
- Class 3** Captives deriving up to 50% of their net premiums from unrelated parties
- Class 3A** Insurers deriving 50% or more of their net premiums from unrelated parties, where total net premiums from business with unrelated parties are less than \$50m
- Class 3B** Insurers deriving 50% or more of their net premiums from unrelated parties, where total net premiums from business with unrelated parties are US\$50m or more
- Class 4** Insurers with capital and surplus of \$100m or more, or writing catastrophe business
- Class 5** Special-purpose insurers



For more
detailed
information
please
download our
Knowledge
Series:



<http://www.munichre.com/en/group/focus/solvency-ii>



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Thank you very much
for your attention



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